UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/087,130	02/28/2002	Nikki M. Bruner	P1569US01	4401

7590 05/10/2006

Fellers, Snider, Blankenship, Bailey & Tippens,
Bank One Tower
100 North Broadway,
Suite 1700
Oklahoma City, OK 73102-8820

EXAMINER	
TORRES, JOSEPH D	

ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 05/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/087,130	BRUNER ET AL.	
	Examiner	Art Unit	
	Joseph D. Torres	2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 March 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13,15-26 and 28-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *15-26* is/are allowed.

6)☒ Claim(s) *1-13 and 28-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 November 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 29 is objected to because of the following informalities: claim 29 is written as a preamble with no body (proper indentation is required). Appropriate correction is required.

The Applicant contends, "Applicant respectfully points out that such indentation is not applicable to claim 29 because the recited description of the circuit operation does not have multiple elements or steps".

The Examiner asserts that a preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

35 U.S.C. 112, second paragraph requires that "The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant".

If the applicant refuses to distinguish what elements the applicant regards as preamble and what elements the Applicant regards as limitations defining the Applicant's invention, the Applicant is not in compliance with 35 U.S.C. 112, second paragraph.

Until the Applicant amends claim 29, the Examiner assumes a single preamble with no limitations. Below, since the preamble of claim 29 recites the same limitations as in claim 28, for now, the Examiner applies the same prior art rejection for claim 29 as for claim 28.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 28 and 29 is rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention.

Claim 29 is written as a preamble with no body (proper indentation is required). Note: preambles are not normally give patentable weight.

The Examiner asserts that a preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

35 U.S.C. 112, second paragraph requires that "The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant".

If the applicant refuses to distinguish what elements the applicant regards as preamble and what elements the Applicant regards as limitations defining the Applicant's invention, the Applicant is not in compliance with 35 U.S.C. 112, second paragraph. Until the Applicant amends claim 29, the Examiner assumes a single preamble with no limitations.

Claim 28 recites, "predicting error rate performance in relation to a selected digital data configuration of a plurality of different digital data configurations for both the same input data and the same output data", which is confusing and indefinite. The Examiner assumes the Applicant intended"--predicting error rate performance in relation to a selected digital data configuration of a plurality of different digital data configurations for both the same input data corresponding to the same output data--.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1, 4-6, 11, 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ott; Stefan (US 6182264 B1) in view of Makansi; Tarek et al. (US 4804959 A, hereafter referred to as Makansi).

35 U.S.C. 103(a) rejection of claims 1, 28 and 29.

Ott teaches a digital data transmission channel 113 for transmitting input data through a physical data channel medium and subsequently receives transmitted output data from the physical data channel medium made from the input data (Figure 1 in Ott teaches a digital data transmission channel 100 which transmits input data 101 to a data channel transmission medium 113 and subsequently receives transmitted output data from the medium 113 made from the input data 101; Note: a transmission channel generally includes a multitude of digital-to-analogue D/A converters, modulators, demodulators, A/D converters etc. to support transmission through he physical channel); and a circuit connected to the digital data channel which can characterize the transmitted input data and the retrieved output data in at least two alternative digital configurations (See circuits 102, 103, 104, 110, 111 and 112 in Figure 1 which characterize transmitted input data and the retrieved output data in at least two alternative digital configurations, CRC, RS or RS+ARQ) and predict error rate performance in relation to a first of the alternative digital configurations for both the input data and output data and, alternatively, to a second of the alternative digital configurations for both the input data

and output data (Sterp 306 in Figure 3 of Ott teaches error rate performance in relation to a first of the alternative digital configurations for both the input data and output data and, alternatively, to a second of the alternative digital configurations for both the input data and output data). Note: the same digital data configuration for the input is also used for the corresponding output for the input.

However Ott does not explicitly teach the specific use of a digital data channel, which stores input data to a data storage medium.

Makansi, in an analogous art, teaches use of a digital data channel, which stores input data to a data storage medium (Figure 4 in Anderson). The Examiner asserts that Figure 1 in Ott teaches an adaptive decoding device for a transmission channel and Makansi teaches an analogous adaptive decoding device for a storage medium designed to maintain an error rate at an acceptable error rate level using adaptive RLL codes to provide immunity to ISI noise. One of ordinary skill in the art at the time the invention was made would have known that storage media suffer from a variety of noise issues just as any other channel medium and would benefit from error correction as taught in both Ott and Makansi.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Ott with the teachings of Makansi by including use of a digital data channel, which stores input data to a data storage medium. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of a digital data channel, which stores input data to a data storage medium would

have provided adaptive error correction capabilities to a storage based on error rate requirements at a given time as taught in the Ott patent.

Note: Until the Applicant amends claim 29; the Examiner assumes a single preamble with no limitations. Below, since the preamble of claim 29 recites the same limitations as in claim 28, for now, the Examiner applies the same prior art rejection for claim 29 as for claim 28.

35 U.S.C. 103(a) rejection of claim 4.

Steps 302-306 in Figure 3 of Ott.

35 U.S.C. 103(a) rejection of claim 5.

Makansi teaches the circuit performs run length limited (RLL) encoding upon the input data prior to characterizing the input data (Encoders 7a-7c in Figure 1 of Makansi perform RLL encoding prior to the Encoder Seelct circuit 8 characterizing encoding requirements for input data), and wherein the circuit further inhibits RLL decoding of the output data to reflect said RLL encoding (Decoder Select 10 in Figure 1 of Makansi substantially inhibits non-selected RLL decoders from being used in future processes to reflect said RLL encoding).

35 U.S.C. 103(a) rejection of claim 6.

Encoding in Figure 1 of Ott is selected in accordance with error correction capabilities of a given error correction code given a particular acceptable error rate, that is, the error

correction code must be able to correct a given number of errors in a time interval to achieve a particular acceptable error rate.

35 U.S.C. 103(a) rejection of claim 11.

The Abstract and Figure 1 of Makansi teaches separate encoders and decoders for characterizing the input and output data in at least two alternative run length limited RLL digital code configurations.

4. Claims 2, 3 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable Ott; Stefan (US 6182264 B1) and Makansi; Tarek et al. (US 4804959 A, hereafter referred to as Makansi) in view of Franaszek, Peter A. (US 3689899 A).

35 U.S.C. 103(a) rejection of claim 2.

Ott and Makansi substantially teaches the claimed invention described in claims 1 and 15 (as rejected above). In addition, the Examiner asserts that once a digital configuration is selected in Figure 2 of Ott it remains the same during a single transmission hence the received and transmitted symbol lengths are the same. If CRC coder 102 in Figure 1 of Ott is a first coder for a first digital configuration then RS coder 103 in Figure 1 of Ott is a second coder.

However Ott and Makansi do not explicitly teach the specific use of multi-bit symbols.

Franaszek, in an analogous art, teaches use of multi-bit symbols (see Abstract in Franaszek; Note: an RLL codeword is a multi-bit symbol).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Ott and Makansi with the teachings of Franaszek by including use of multi-bit symbols. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of multi-bit symbols would have provided a desired coding efficiency achieved without unduly complicating the design of the encoding and decoding apparatus if the encoded information is handled in the form of variable-length symbol words rather than fixed-length symbol words (see col. 1, lines 31-37 in Franaszek).

35 U.S.C. 103(a) rejection of claim 3.

The Abstract in Franaszek teaches variable length multibit codeword symbols.

35 U.S.C. 103(a) rejection of claim 12.

Figure 1B in Franaszek teaches a shift register for arranging variable length codeword symbols. Shift register components are state machines.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ott; Stefan (US 6182264 B1) and Makansi; Tarek et al. (US 4804959 A, hereafter referred to as Makansi) in view of Reed; David E. et al. (US 6115198 A, hereafter referred to as Reed).

35 U.S.C. 103(a) rejection of claim 7.

Ott and Makansi substantially teaches the claimed invention described in claim 1 and 15 (as rejected above).

However Ott and Makansi does not explicitly teach the specific use of interleaving.

Reed, in an analogous art, teaches use of interleaving (see Interleaver 100 in Figure 9A of Schachner).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Ott and Makansi with the teachings of Reed by including use of interleaving. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of interleaving would have provided the opportunity to effectively decode RLL encoded data.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ott; Stefan (US 6182264 B1) and Makansi; Tarek et al. (US 4804959 A, hereafter referred to as Makansi) in view of Schachner; Joseph M. et al. (US 6442730 B1, hereafter referred to as Schachner).

35 U.S.C. 103(a) rejection of claim 8.

Ott and Makansi substantially teaches the claimed invention described in claim 1 and 15 (as rejected above). In addition, Makansi teaches the circuit performs run length limited (RLL) encoding upon the input data prior to characterizing the input data (Encoders 7a-

7c in Figure 1 of Makansi perform RLL encoding prior to the Encoder Seelct circuit 8 characterizing encoding requirements for input data), and wherein the circuit further inhibits RLL decoding of the output data to reflect said RLL encoding (Decoder Select 10 in Figure 1 of Makansi substantially inhibits non-selected RLL decoders from being used in future processes to reflect said RLL encoding).

However McNeil and Makansi do not explicitly teach the specific use of emulation. Schachner, in an analogous art, teaches use of emulation (see Abstract in Schachner). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Ott and Makansi with the teachings of Schachner by including use of emulation. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of emulation would have provided more accurately determine if errors exist in the signal (col. 4, lines 56-62 in Schachner).

7. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable Ott; Stefan (US 6182264 B1), Makansi; Tarek et al. (US 4804959 A, hereafter referred to as Makansi) and Franaszek, Peter A. (US 3689899 A) in view of McNeil; Michael et al. (US 5995305 A, hereafter referred to as McNeil).

35 U.S.C. 103(a) rejection of claim 9.

Ott, Makansi and Franaszek substantially teaches the claimed invention described in claims 1 and 2 (as rejected above).

However Ott, Makansi and Franaszek do not explicitly teach the specific use of predicting error rate performance by comparing the input sequence and the output sequence.

McNeil, in an analogous art, teaches predicting error rate performance by comparing the input sequence and the output sequence (Col. 14, lines 18-32 in McNeil teaches that Soft Error Rate Comparator Circuit 108 in Figure 6 for predicting error rate performance by comparing the input sequence and the output sequence).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Ott, Makansi and Franaszek with the teachings of McNeil by including use of predicting error rate performance by comparing the input sequence and the output sequence. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of predicting error rate performance by comparing the input sequence and the output sequence would have provided a means for calculating raw error rate as required in the Ott patent.

35 U.S.C. 103(a) rejection of claim 10.

The Abstract and Figure 1 of Makansi teaches separate encoders and decoders for characterizing the input and output data in at least two alternative run length limited RLL digital code configurations.

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable Ott; Stefan (US 6182264 B1), Makansi; Tarek et al. (US 4804959 A, hereafter referred to as Makansi) and Franaszek, Peter A. (US 3689899 A) in view of Lee; Patrick J. (US 6405342 B1).

35 U.S.C. 103(a) rejection of claim 13.

Ott, Makansi and Franaszek substantially teaches the claimed invention described in claims 1, 2 and 12 (as rejected above).

However Ott, Makansi and Franaszek do not explicitly teach the specific use of determining an uncorrectable number of erroneous symbols in each interleave that exceed a correctable number of erroneous symbols that can be detected by a first ECC encoding methodology.

Lee, in an analogous art, teaches use of determining an uncorrectable number of erroneous symbols in each interleave that exceed a correctable number of erroneous symbols that can be detected by a first ECC encoding methodology (col. 9, lines 6-10, Lee).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Ott, Makansi and Franaszek with the teachings of Lee by including use of determining an uncorrectable number of erroneous symbols in each interleave that exceed a correctable number of erroneous symbols that can be detected by a first ECC encoding methodology. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of

ordinary skill in the art would have recognized that use of determining an uncorrectable number of erroneous symbols in each interleave that exceed a correctable number of erroneous symbols that can be detected by a first ECC encoding methodology would have provided an indicator for retry operations based on uncorrectable error level (col. 9, lines 6-28, Lee).

9. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ott; Stefan (US 6182264 B1) in view of McNeil; Michael et al. (US 5995305 A, hereafter referred to as McNeil).

35 U.S.C. 103(a) rejection of claim 30.

Ott teaches characterizing data in a selected digital configuration from a plurality of selectable digital configurations (See circuits 102, 103, 104 in Figure 1 which characterize input data to the transmitter in at least two alternative digital configurations, CRC, RS or RS+ARQ); and characterizing transmitted data from the initial data in the selected digital configuration (See circuits 110, 111 and 112 in Figure 1 which characterize transmitted data in at least two alternative digital configurations, CRC, RS or RS+ARQ).

However Ott does not explicitly teach the specific use of comparing the characterized data in order to predict an error rate performance associated with storing and retrieving the data.

McNeil, in an analogous art, teaches use of comparing the characterized data in order to predict an error rate performance associated with storing and retrieving the data (Col. 14, lines 18-32 in McNeil teaches that Soft Error Rate Comparator Circuit 108 in Figure 6 for predicting error rate performance by comparing the input sequence and the output sequence).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Ott with the teachings of McNeil by including use of comparing the characterized data in order to predict an error rate performance associated with storing and retrieving the data. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of comparing the characterized data in order to predict an error rate performance associated with storing and retrieving the data would have provided a means for calculating raw error rate as required in the Ott patent.

Allowable Subject Matter

10. Claims 15-26 are allowed.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

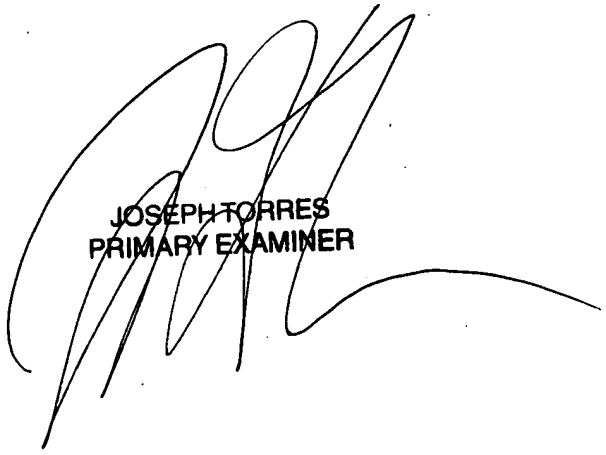
§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph D. Torres whose telephone number is (571) 272-3829. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Joseph D. Torres, PhD
Primary Examiner
Art Unit 2133